

CLAIMS

- 1) A process for the preparation of metal-coated polymer nano-fibres, characterised by the following steps
  - a) preparing a polymer nano-fibre with functional groups providing the binding ability to a reducing reagent by electro-spinning at ambient conditions;
  - b) contacting the electrospun polymer nano-fibre obtained in step a) with a reducing agent, thereby opening the epoxy ring on the surface of polymer nano-fibre and replacing with the reducing agent;
  - c) reacting the reducing agent modified polymer film obtained in step b) with a metal salt solution in alkaline media;
  - d) treating the electrospun mat obtained in step c) with water to open the epoxy rings in the structure and crosslinking the chains to provide integrity.
- 2) Process according to claim 1, characterised in that the polymer in step a) is obtained by radical or condensation polymerisation of I) monomers chosen from the group comprising vinylic monomers and difunctional monomers with II) functional monomers chosen from the group comprising acrylates, epoxides, acrylamides, and acidic comonomers.
- 3) Process according to claim 2, characterised in that the polymer in step a) is chosen from the group comprising poly(acrylonitrile-co-glycidylmethacrylate) and poly(styrene-co-glycidylmethacrylate).
- 4) Process according to any one of the preceding claims, characterised in that the reducing agent in step b) is chosen from the group comprising hydrazine, alkali borohydride, CuCl, SnCl<sub>2</sub>.
- 5) Process according to claim 4, characterised in that the reducing agent in step b) is hydrazine.
- 6) Process according to any one of the preceding claims, characterised in that the metal solution in step c) comprises soluble transition metal salts in a solvent, comprising AgNO<sub>3</sub> in water, AgCl in water, NiCl<sub>2</sub> in water, and PdCl<sub>2</sub> in DMF.
- 7) Metal-coated polymer nano-fibres obtained by the process in accordance to any one of the preceding claims.
- 8) Use of the metal-coated polymer nano-fibres in applications chosen from the group comprising nanotubes, catalysts, conductors, solar cells, electrodes for sensors, electrochemical actuators, proton exchange membranes and electrodes, hydrogen storage membranes, high density packing structures, thin film transistors, reflectors, compact disks and decorative applications.

- 9) Catalysts containing metal-coated polymer nano-fibers obtained in accordance to any one of claims 1 to 6.
- 10) Conductors containing metal-coated polymer nano-fibers obtained in accordance to any one of claims 1 to 6.